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[Note: Names, addresses, company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified by a numeral prefix or a general form of plurality suffix.]

Description of the Invention

1. Name of the Invention

Rolled Form Removing Device for Sheet Type Material

2. Scope of the Claims

(1) Rolled form removing device for sheet type material characterized by the fact that it is a rolled form removing device where a sheet material that has been wound in a roll form is transported where the structure is formed so that two pairs of rollers are placed on the upstream and downstream side of the sheet material and the peripheral speed of the rollers that are on the upstream side in the sheet transport direction can be made higher than that of the downstream side rollers, or the peripheral speed of the downstream side rollers, for a certain period of time, can be made to be lower, or to stop or to rotate in the reverse direction, and thus a slack is maintained in the direction opposite to the winding direction of the sheet material, and especially, it is possible to freely adjust the gap between the above described two pairs of rollers.

(2) Rolled form removing device for sheet type material characterized by the fact that it has a device that detects the outer diameter of the wound roll obtained as the sheet material has been wound, and the gap between the arranged two pairs of rollers can be adjusted in correspondence with this roll outer diameter.

3. Detailed Explanation of the Invention

<Technical Application Field>

The present invention is about a device that removes the rolled form of sheet type materials in photographic devices, faxes, printers etc., where a wound in a roll form sheet material is transported and handled.

<Previous Technology>

In the case of this type of devices according to the previous technology, in order to remove the rolled form of the wound in a roll form sheet type material, the procedure has been conducted as the sheet material conveying direction is changed abruptly as it is bent

at a sharp angle. However, because of the fact that the sheet material transport direction is changed abruptly, it is difficult for the leading edge part of the sheet material to follow at the part of the abrupt change of the transportation direction as the sheet material is being transported, and consequently, the material where once this sudden change part is passed, usually, has a structure that is formed so this abrupt change part is passed. Because of that even in the state when the sheet material is not being transported and it is in a supported state the sheet has certain locations where it is maintained in a state of abrupt turns.

After that, if we are to provide a detailed explanation of this device according to the previous technology, Figure 11 is a diagram showing an example of a printer that houses a rolled form removal device according to the previous technology.

In the diagram, 1 represents an unwound roll sheet material that has been unwound by the unwinding roll 1a, 2 represents a V shaped abrupt angle bent rolled form removal device, and the sheet material 1 is guided between the guides 2a and 2b of the rolled form removal device 2. The sheet material 1 passes through the part of the removal device 2 that is changing at the most abrupt angle and by that it is unwound and removed. 3 represents the full line printing thermal head, 4 represents the platen roller used for the transport of the sheet material. Consequently, the structure is formed so that the sheet material 1 that has been printed by the thermal head 3 is transported to the outside of the printer through the platen roller 4, and especially, so that it is cut by the sharp part 5.

<Problems Solved by the Present Invention>

However, in the case according to the above described previous technology example, only a specific part of the sheet is maintained in a state where it is bent at acute angle and because of that this becomes a factor and there is the drawback point that there is a generation of roll form in the direction opposite to the previous roll form winding direction.

Especially, in the case according to the present invention, a technology is suggested whereby the above described drawback point according to the previous technology is eliminated and at the same time, for example, the roll form sheet type material is maintained stored in the state as it is in a roll form, and in the case when as the large changes of the temperature during the use of this device or of the air temperature, etc., effects are experienced, the winding rate becomes different, the user can adjust the conditions of the rolled form removal in correspondence with these circumstances.

<Measures in Order to Solve the Problems>

Regarding the measures in order to improve the above described problems, it is a device for the removal of the rolled form from the wound sheet type material characterized by the fact that it is a device where a sheet material that has been wound in a roll form is transported where the structure is formed so that two pairs of rollers are placed on the upstream and downstream side of the sheet material and the peripheral speed of the rollers that are on the upstream side in the sheet transport direction can be made higher

than that of the downstream side rollers, or the peripheral speed of the downstream side rollers, for a certain period of time, can be made to be lower, or to stop or to rotate in the reverse direction, and thus a slack is maintained in the direction opposite to the winding direction of the sheet material, and especially, it is possible to freely adjust the gap between the above described two pairs of rollers.

<Effect>

In the case of the device according to the present invention, as it has been described here above, it is a device where the structure is formed so that two pairs of rollers are placed on the upstream and downstream side of the sheet material and together with that it is possible to freely adjust the gap between the above described two pairs of rollers, and because of that it is possible to extremely smoothly and evenly remove the roll form of sheet materials with different degree of unwinding.

<Practical Example>

If we are to explain in details one practical example of the device according to the present invention, Figure 1 represents an explanation diagram showing a cross sectional view of the central part of a printer that houses a rolled form removal device according to the present invention. In Figure 1, 1 represents the sheet material that has been unwound by the roll 1a, 3 represents the full line printing thermal head, 4 represents a platen roller, 6 represents an auto cutter, 7, 8 represent a pair of rollers used in the rolled form removal device according to the present invention, 9, 10 represent back up rollers that a pressure contacted correspondingly with the rollers 7 and 8.

In the case of this device, the sheet material 1 is a heat sensitive paper material, and its leading edge, at the time of the stand by, is enclosed between the platen roller 4 and the thermal head 3. If this device begins printing, the platen 4 rotates in the direction of the arrow shown in the figure, and the sheet material 1 is transported in the direction of the arrow c in the figure. As the leading edge of the sheet material 1 is being guided by the guide part it passes through the auto cutter 6 and it is guided towards the pair of rollers 7 and 8, which are used in rolled form removal device, and it is supported by the back up rollers 9 and 10, a slack in the predetermined direction is imparted and the roll form is removed, and after that it is taken outside of the device. Here, the printing by the thermal head 3 and the platen roller 4 have an action that has the same period, however, it is not necessary that the used in the rolled form removal device pair of rollers 7 and 8 and the platen roller 4 have the same period.

The sheet material that is printed by the thermal head 3 is transported by the rollers 4, 7, 8, 9 and 10 and it is temporarily stopped. Then, the auto cutter 6 starts its cutting action and the sheet material 1 is cut at the predetermined position. The cut sheet material 1 is taken outside and retrieved by using the rollers 7, 8, 9 and 10. On the other hand, the sheet material 1 that remains on the side of the thermal head 3 is returned in the direction opposite to the arrow c by a rotation of the platen roller 4 in the direction of the arrow b

shown in the figure, and it is returned in a state where it is enclosed between the platen roller 4 and the thermal head 3.

Here, the process of the removal of the rolled form of the wound in a roll shape sheet material 1 is described by using Figure 2 through Figure 4 as reference. According to Figure 2, the leading edge of the sheet material 1 is transported by the rollers 7 and 9 and it is guided in the guide 11, and it becomes in an e state shown by the 1 point chain line. Here, there is no problem if the start up done by either the roller 7 or by the roller 9, or by both. Also, regarding the roller 7 and 9, it is desirable that they have the same period as the platen roller 4, however, in the case when the friction coefficient between the platen roller and the sheet material 1 is higher than the friction coefficient between the roller 7, roller 9 and the sheet material 1, it is also a good option if the rollers 7 and 9 are rotating at a speed that is higher than that of the platen roller 4, and it is also a good option if the sheet material 1 and the rollers 7 and 9 are sliding. Here, the leading edge of the sheet material 1 in the state e protrudes to the outer perimeter of the roller 8. Consequently, it is desirable that the rollers 7, 9 and the rollers 8, 10 have the same period until the leading edge of the sheet material 1 is enclosed between the rollers 8, 10, however, there is no problem if the peripheral speed of the rollers 8 and 10 is slower than the peripheral speed of the rollers 7 and 9.

Also, if the friction coefficient between the rollers 7, 9 and the sheet material 1 is higher than the friction coefficient between the rollers 8 and 10 and the sheet material 1, it is good if the peripheral speed of the rollers 8, 10 is faster than that of the rollers 7, 9. The leading edge of the sheet material 1 is guided by the outer perimeter of the roller 8, and it is squeezed and inserted between the roller 8 and the roller 10. Here, in order to detect the fact that the leading edge of the sheet material 1 is enclosed between the roller 8 and 10, it is a good option if after the stand by state, the number of revolutions of the platen roller 4 are counted and it is also a good option if, a sensor 12 as shown in Figure 2, is provided and the leading edge of the sheet material 1 is detected. Here, if a stepping motor etc., external device that can control the number of revolutions of the motor, is used as the start up (driving) means for the platen roller 4, by counting the number of revolutions of the above motor it is possible to obtain the number of revolutions of the platen roller 4. After that, according to Figure 3, if the leading edge of the sheet material 1 enclosed between the rollers 8 and 10, the rollers 7, 9 are rotating and continue the same way as shown at the time of the state shown in Figure 2, and the rollers 8, 10 become in any of the following three states: “stopped”, “their peripheral speed is slower than that of the rollers 7, 9”, “as shown by the chain line according to Figure 3, they rotate in reverse”. If this is done, the guide 11 is placed on the side opposite to the unwind side as shown in Figure 3, defined through the imaginary line connecting the contact point between the rollers 7 and 9 and the contact point between the rollers 8 and 10; and because of that the sheet material 1 becomes in a state that has the slack as shown by the letter f in Figure 2.

Especially, the slack of the sheet material 1 takes on the subsequent states from g through h. Here, in the case when the rollers 8 and 10 are rotated in the reverse direction and the above described states of the slack of the sheet material 1 are achieved, for the leading edge of the sheet material 1, the thrust part that is rotated in reverse through the contact

point between the rollers 8 and 10, does not become like the shown in Figure 2 part, which has been transported a lot. Here, regarding the sheet material 1, for any of the states f, g or h, the abrupt turn in the direction opposite to the unwind direction and the winding of that part that has been bent through this abrupt turn, are automatically eliminated. It is a good option if the most appropriate rolled form removal for any of the states f, g and h, is determined according to the material of the roll form sheet material, or the condition (degree) of the rolled form removal, however, in the case of this printer device, the state f, achieved through the condition 1a where the sheet material 1 is almost not consumed, is the most appropriate.

As measures in order to detect if any of the sheet material 1 states f, g and h, have been achieved, it is a good option if the difference between the amount of the transported paper by the rollers 7, 9 and the amount of the transported paper by the rollers 8, 10, is detected. For example, in the case when each of the above described rollers is rotated by a stepping motor, it is a good option if their number of revolutions are counted and compared. Also, in the case when it is rotated by using a DC motor, etc., it is also a good option if the time of the rotation of each roller is controlled etc.

To obtain the optimum conditions for the removal of the rolled form, as it is shown in the presented below Figure 4, the rollers 8, 10 rotate at the same peripheral speed as the rollers 7, 9. If this is done, the sheet material 1 even as it is transported is maintained in the above described usually constant optimum state, and by using this rolled form removal device the rolled form of the sheet material 1 is automatically and also stably removed

Regarding the rollers 7, 8, 9 and 10 of this device, it is desirable that the roller periphery is made from rubber etc., material that has a friction coefficient. This is especially applicable to the rollers 7 and 8.

In Figure 5 a three-dimensional diagram of a rolled form removal device that is one practical example of the present invention is shown. According to Figure 5 each roller is connected continuously in the axial direction, however, as shown in Figure 6, there is no problem if the rollers 7, 8, 9 and 10 are separated in several blocks and they are in a state where the contact separately the sheet material 1.

Then, the diagram where here the roller 8 is close to the roller 7 is shown in Figure 7.

If this is done, the states of the slack of the sheet material 1 in the winding direction and in the opposite direction, are shown in Figure 3, and the states f, g and h according to Figure 3, become the states f', g' and h' shown in Figure 7. If here the states f and f', the states g and g' and the states h and h' are compared, the part where the roller gap becomes narrow, the rolled form of the sheet material 1 of the states f', g', h' and the bending of the slack in the opposite direction, become severe. Because of that, also for the results of the removal of the rolled form, the following is obtained:

f<f', g< g', h< h'

As it is shown in Figure 8 if the rollers 7 and 8 are rotated with the same period so that the states f', h' are maintained, the rolled form of the whole body of the sheet material 1 can be smoothly removed.

This way, by using the present rolled form removal device, the narrower the gap between the roller 7 and the roller 8 is made the stronger the effect of the removal of the rolled form becomes. However, if the roller gap is made excessively narrow, at this point it is practically confirmed that the wound in a roll shape sheet material 1 assumes a rolled form in a direction opposite to the current rolled form.

Here, as it is shown according to the three-dimensional diagram shown in Figure 9, the structure is formed as both ends of the roller 8 extend outside of the device, and on the frame side plates 20, 21, the pair of the cutting parts 20a, 21a, are each positioned, and the roller 8 is extended in the direction where the cutting parts are provided through the spring parts 22 and 23. Consequently, through this structure, the user can adjust from the outside the position of the roller 8 to the position of the cutting pairs depending on the requirements (optionally).

Especially, according to Figure 1, a state is represented where the winding rolls 1b, 1c are sequentially consuming the sheet material 1, which has been taken up by the winding roll 1a, and the arm 16, which is along the outer diameter of the winding roll 1a is rotated on the center of the variable resistance 15. Through the rotation angle of the arm 16, the resistance value of the variable resistance element 15 is changed, and the device can detect the outer diameter of the wound roll 1 through the knowledge of this resistance value. Here, regarding the three-dimensional diagram, as shown in Figure 10, a structure is formed where the plungers 24, 25 are connected to both ends of the roll 8, and whereby it is possible that at the time when the outer diameter of the wound roll 1a, namely, the outer diameter at the time when the rolled form of the wound sheet material 1 becomes strong, becomes lower than a certain diameter, through the plungers 24 and 25 the roller 8 is pulled towards the roller 7 and the gap between the rollers 7 and 8 is made to be smaller.

According to the present example the structure has been formed as the start up roller has a structure formed as the roller 10 and roller 9 or roller 7, however it is also a good option if the start up roller is made to be the roller 9 and roller 8 or roller 10, so that the roller 7 is moving.

<Results From the Present Invention>

In the case of the device according to the present invention, it has the characteristics that the above described structure and effect are used and by that there is no passing through a guide part, which bends the sheet material at an abrupt angle, or there is no stand by in a state for a good amount of time in a state where the material is threaded up through that part, which has been the case according to the previous technology, and because of that it is possible to fundamentally eliminate the generation of rolled form in a direction

opposite to the rolled form in the sheet material, and not only that, but also, it is possible to freely vary the roller number of revolutions, or diameter etc., depending on the material type of the sheet, the magnitude of the rolled form etc., and it is possible to completely remove the rolled form of the sheet material; and not only that but also, because of the fact that according to the present invention it is possible to freely adjust the gap between the pair of arranged rollers that are used for the removal of the rolled form, it is possible to change the roller gap in correspondence with the strength or weakness of the rolled form produced depending on the period of time where the sheet material has been wound in a roll shape, the storage conditions, the material type of the sheet material, etc., and by that it is possible to smoothly remove the roller form of the sheet type material to achieve the best theoretical state, etc.

4. Brief Explanation of the Diagrams

Figure 1 represents a sectional view diagram of the center part of the printer showing one practical example according to the present invention. Figure 2 through Figure 4, and Figure 7, Figure 8 represent sectional view diagrams in order to explain an example of the conditions of the present invention. Figure 5, Figure 6, Figure 9 and Figure 10 represent correspondingly three-dimensional diagrams showing practical examples according to the present invention. Figure 11 represents an explanation sectional view diagram showing an example according to the previous technology.

1 represents the sheet material, 2a and 2b represent guides, 4 represents a platen roller, 6 represents a cutter, 7, 8, 9, 10 represent rollers, 11 represents guide, 15 represents a variable resistance, 16 represents an arm, 20, 21 represent side plates, 20a, 21a represent cutting parts, 22, 23 represent springs, 24, 25 represent plungers.

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審査請求　未請求　発明の数 1　（全8頁）

⑤4発明の名称　シート材巻きぐせ除去装置

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明　細　書

1．発明の名称

シート材巻きぐせ除去装置

2．特許請求の範囲

(1)ロール状に巻き取られたシート材を搬送する装置に於いて、2個のローラを上流側及び下流側に配列し、シート材搬送方向上流側のローラの周速度を下流側ローラより速くするか或いは下流側のローラの周速度を上流側のローラの周速度よりもある一定時間遅くするか、止めるか、又は逆回転することが可能な如く構成し、シート材に巻きぐせと反対方向のたるみを持たせ、更に前記2個のローラの隙間を自在に調整可能としたことを特徴とするシート材巻きぐせ除去装置。

(2)シート材が巻き取られた巻取ロールの外径を検出する手段を有し、このロールの外径に応じて並列された2個のローラの隙間を調整可能としたことを特徴とする特許請求の範囲第1項記載のシート材巻きぐせ除去装置。

3．発明の詳細な説明

＜産業上の利用分野＞

本発明はロール状に巻き取られたシート材を搬送する複写機，ファクシミリ，プリンター等に於けるシート材の巻きぐせ除去装置に関するものである。

＜従来の技術＞

従来のこの種の装置は、ロール状に巻き取られたシート材の巻きぐせを除去するために、シート材の搬送方向を急角度に折り曲げて急変させることによって行っていた。しかしながらシート材の搬送方向を急変させるために、シート材の搬送に伴ってシート材の先端をその搬送方向急変部に通すことが困難であり、従って一旦この急変部を通したシート材は常にその急変部を通っているように構成されていた。この為にシート材が搬送されない待機状態に於いてもシート材の一定箇所が急変されたまま放置されていた。

次にこの従来の装置について具体的に説明すると、第11図は従来使用されていた巻きぐせ除去装置を搭載したプリンターの例を示すものである。

図中1は巻取ロール1aより引き出されたロール状シート材、2はV状に急角度に折り曲げられた巻きぐせ除去装置であって、シート材1は巻きぐせ除去装置2のガイド2aと2bの間に導かれている。シート材1は除去装置2の最も鋭角的に変化する部分を通過することによって巻きぐせが除去されることになる。3はフルライン印字のサーマルヘッド、4はシート材搬送用プラテンローラである。従ってサーマルヘッド3で印字されたシート材1はプラテンローラ4によってプリンターの外部に搬送され、更に鋭利部5により切断されるように構成されている。

＜発明が解決しようとする問題点＞

しかしながら上記従来例では待機時にはシート材の特定部のみが急角度に折り曲げたまま放置されるので、これが原因となって、従来のロール状に巻き取られていた巻きぐせと反対方向の巻きぐせが発生する欠点があった。

特に本発明は上述の従来の欠点を除去すると同時に例えばロール状シート材がロール状のまま倉庫等に保管されていたり、本装置を使用する時の湿度や気温が大きく変化するなどの影響を受けて、巻きぐせの度合が異なる場合にはユーザが巻きぐせ除去の度合をその状況に対応してその都度調整することも可能とした技術を提供しようとするものである。

＜問題点を解決するための手段＞

上記問題点を改善する本発明の手段は、ロール状に巻き取られたシート材を搬送する装置に於いて、2個のローラを上流側及び下流側に配列し、シート材搬送方向の上流側のローラの周速度を下流側ローラより速くするか或いは下流側のローラの周速度を上流側のローラの周速度よりもある一定時間遅くするか、止めるか、又は逆回転することが可能な如く構成し、シート材に巻きぐせと反対方向のたるみを持たせ、更に2個のローラの隙間を自在に調整可能に構成したシート材巻きぐせ除去装置である。

＜作用＞

本発明に係る装置に於いては上述の如く、シート材の搬送方向の上流側及び下流側に巻きぐせ除去用のローラを並列して設けると共に、これ等のローラの隙間を自在に調節し得る如く構成したので、この両者の隙間を調節することによって、巻きぐせの度合が異なるシート材の巻きぐせを極めてスムーズに均一に除去することが出来る。

＜実施例＞

本発明の装置の一実施例を具体的に説明すると、第1図は本発明の巻きぐせ除去装置を搭載したプリンターの中央断面図を示す説明図であって、図中1はロール1aより引き出されたシート材、3はフルライン印字のサーマルヘッド、4はプラテンローラ、6はオートカッター、7，8は本発明の巻きぐせ除去装置用の一対のローラ、9，10は夫々ローラ7，8に対応して圧接するバックアップローラである。

本装置に於いて、シート材1は感熱紙であって、その先端は待機時に於いてはプラテンローラ4とサーマルヘッド3の間に挟まれている。本装置が印字を始めるとプラテンローラ4は図中に示す矢印a方向に回転し、シート材1を図中矢印c方向に搬送する。シート材1の先端はガイド部材によってガイドされながらオートカッター6を通り、巻きぐせ除去装置用の一対のローラ7，8へ導かれ、バックアップローラ9，10で保持されながら所定の方向にたるみを与えられて巻きぐせが除かれた後、装置外に排出される。ここでサーマルヘッド3の印字とプラテンローラ4とは同期して作動するが、巻きぐせ除去装置用の一対のローラ7，8とプラテンローラ4は必ずしも同期する必要はない。

サーマルヘッド3によって印字されたシート材1はローラ4，7，8，9，10によって搬送され、一旦停止する。そこでオートカッター6は切断動作を開始し、シート材1を所定位置で切断する。切断されたシート材1はローラ7，8，9，10によって装置外に排出される。一方サーマルヘッド3側に残ったシート材1はプラテンローラ4が図中矢印b方向に回転することによって矢印cと逆方向に戻され、プラテンローラ4とサーマルヘッ

ド3に挟まれて待機状態に戻る。

ここでロール状に巻き取られたシート材1の巻きぐせが除去される過程を第2図乃至第4図を用いて詳述する。第2図に於いてシート材1の先端はローラ7，9により搬送されガイド11に導かれ、1点鎖線に示すeの様な状態になる。ここで駆動するのはローラ7でもローラ9でもその両方でもかまわない。またローラ7，9はプラテンローラ4と同期していることが望ましいが、プラテンローラ4とシート材1の摩擦係数がローラ7，9とシート材1との摩擦係数より大きい場合にはローラ7，9をプラテンローラ4より速い周速度で回し、シート材1とローラ7，9を滑らせても良い。ここでeの状態にあるシート材1の先端はローラ8の外周に突き当たる。従ってシート材1の先端がローラ8，10の間に挟まれるまではローラ7，9とローラ8，10は同期していることが望ましいが、ローラ7，9の周速度よりローラ8，10の周速度は遅くてもかまわない。

またローラ7，9とシート材1の摩擦係数がローラ8，10とシート材1との摩擦係数より大きければローラ7，9よりローラ8，10の周速度を速くして良い。シート材1の先端はローラ8の外周によって導かれ、ローラ8とローラ10との間に挟み込まれる。ここでシート材1の先端がローラ8，10の間に挟まれたことを知るために、待機状態からプラテンローラ4の回転した数をカウントしても良いし、第2図に示すようなセンサー12を設けてシート材1の先端を検出しても良い。ここでステッピングモーターなどの外部からモーターの回転数を制御できるものをプラテンローラ4の駆動手段として用いれば、該モーターの回転数をカウントすることでプラテンローラ4の回転数を知ることが出来る。次に第3図に於いて、シート材1の先端がローラ8，10に挟まれるとローラ7，9は第2図に示す状態の時と同様に回り続けるが、ローラ8，10は「停止」，「ローラ7，9より周速度を遅くする」，「第3図に鎖線で示すように逆転する」の3状態のいずれかになる。そうするとガイド11がローラ7，9の接点とローラ8，10の接点を結んだ仮想の直線より、第3図に示す巻きぐせと反対側に設けられているため、シート材1は図中fのようなたるみを持つことになる。

更にシート材1のたるみは次々に状態gから状態hとなっていく。ここでローラ8，10を逆転させて前記に述べたシート材1のたるみの状態を作ろうとした場合にはシート材1の先端はローラ8，10の接点より逆転を見込んだ分第2図に示す分だけ多く送り込んでおかなくてはならない。ここでシート材1は状態f，g，hのいずれの状態に於いても巻きぐせと反対方向に急激に曲げられており、この急激に曲げられた部分において巻きぐせが自動的に除去される。状態f，g，hのどの状態が巻きぐせの除去に最適であるかはロール状シート材1の材質や巻きぐせの度合によって決められれば良いが、本プリンター装置に於いてはシート材1がほとんど消費されていない1aの状態では状態fが最適であった。

シート材1が状態f，g，hのどのような状態になっているかを知る手段としてはローラ7，9の紙送り量とローラ8，10の紙送り量の差を知れば良い。例えば前記各ローラ類をステッピングモーターで回している場合にはその回転数をカウントして比較すれば良い。またDCモーター等で回している場合には各ローラの回転時間等を管理すれば良い。

巻きぐせを除去するのに最適な状態が得られると次に第4図に示すようにローラ8，10はローラ7，9と同じ周速度で回転する。そうするとシート材1が搬送されても常に一定した前記の最適な状態を保つことになり、シート材1は本巻きぐせ除去装置を通過した全てが自動的にしかも完全に巻きぐせが取られるようになる。

本装置のローラ7，8，9，10はゴム等摩擦係数の高い材質がローラ外周にあることが望ましい。それは特にローラ7，8に言えることである。

第5図に本発明の一実施例である巻きぐせ除去装置の斜視図を示す。第5図では各ローラは軸方向に連続的につながっているが、第6図に示す如くローラ7，8，9，10は数個のブロックに分割

して部分的にシート材1と接触する様に形成してもかまわない。

さてここで第3図に於けるローラ8をローラ7に近づけた図を第7図に示す。

そうするとシート材1の巻き方向と逆方向のたるみの状態が第3図に於いては状態f，g，hだったものが第7図に示す状態f′，g′，h′となる。ここで状態fとf′，状態gとg′，状態hとh′を比べるとローラの隙間が狭くなった分、状態f′，g′，h′のシート材1の巻きぐせと逆方向のたるみの曲がりが急激となる。その為巻きぐせ除去の効果も

f＜f′，g＜g′，h＜h′　となる。

第8図に示すように状態f′，h′を保つようにローラ7とローラ8を同期して回してもシート材1の全体の巻きぐせがスムーズに除去される。

このように本巻きぐせ除去装置では、ローラ7とローラ8の隙間を狭くすれば狭くするほど巻きぐせを除去する効果は強くなる。しかしながらあまり過度にローラ間を狭くすると、今度はローラ状に巻かれたシート材1が本来持っている巻きぐせと反対方向の巻きぐせが起こることが実験的に判明した。

そこで第9図の斜視図に示すようにローラ8の両端を装置外に出し、フレームの側板20，21に切込部20a，21aを各々2個設け、ローラ8をバネ22，バネ23で切込部の設けてある方向に引っ張って構成した。従ってこの構成によでユーザーが外部から必要に応じてローラ8の位置を2個の切り込みのどちらにするか調整することが可能となっている。

更に第1図に於いて巻取ロール1b，1cは巻取ロール1aより引き出されたシート材1が順に消費されていった状態を表しており、巻取ロール1aの外径に沿ってアーム16は可変抵抗15を中心に回転する。アーム16の回転角によって可変抵抗15の抵抗値は変化していき、装置はその抵抗値を知ることによって巻取ロール1aの外径を検知することが出来る。そこで斜視図、第10図にあるようにプランジャー24，25をロール8の両端に連結しておき、巻取ロール1a、即ちシート材1の巻きぐせがだんだん強くなってきた時の外径がある径以下になった時、プランジャー24，25によってローラ8をローラ7の方向に寄せてローラ7，8間の隙間を小さくすることが出来るように構成されている。

本実施例に於いては駆動ローラをローラ10とローラ9又はローラ7として構成したが駆動ローラをローラ9とローラ8又はローラ10とすればローラ7を移動するような構成にしても良い。

＜発明の効果＞

本発明に係る装置は上述の如き構造と作用とを有するので、従来の如くシート材を急角度で折れ曲がったガイド部を通過させたり、或いはこの部分に通過させたまま長い時間待機させることがないので、シート材に巻きぐせと反対方向の巻きぐせが発生することを根本的に防止することが出来、しかもシート材の材質，巻きぐせの大小等によってローラの回転数、或いは径等を変えることによって自在に対応し、シート材の巻きぐせを完全に除去することが出来、しかも本発明に於いては並列された一対の巻きぐせ除去用のローラの隙間を自在に調節することができるので、シート材がローラ状に巻き取られていた期間，保管時の条件，シート材の材質等による巻きぐせの強弱に対応してローラの隙間を変化させ、これによってシート材の巻きぐせを一番理想とする状態にスムーズに除去することが出来る等の特徴を有するものである。

4．図面の簡単な説明

第1図は本発明の一実施例を示すプリンターの中央断面図、第2図乃至第4図及び第7図，第8図は本発明の状態例を詳述した断面図、第5図，第6図，第9図及び第10図は夫々本発明の実施例を示す斜視図、第11図は従来例を示す断面説明図である。

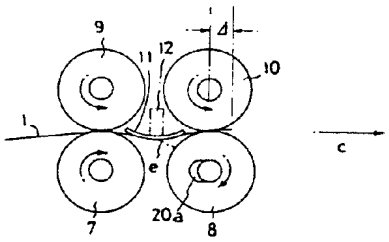
1はシート材、2a，2bはガイド、4はプラテンローラ、6はカッター、7，8，9，10はローラ、11はガイド、15は可変抵抗、16はアーム、20，21は側板、20a，21aは切込部、22，23はバ

ネ、24，25はプランジャーである。

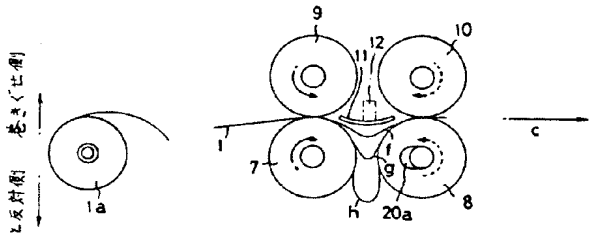
特許出願人　　キヤノン株式会社

代　理　人　　弁理士　　中　川　周　吉

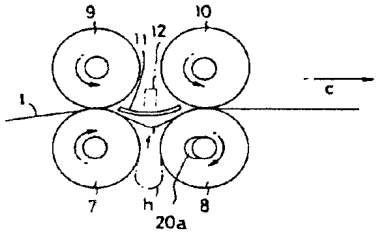
第 2 図



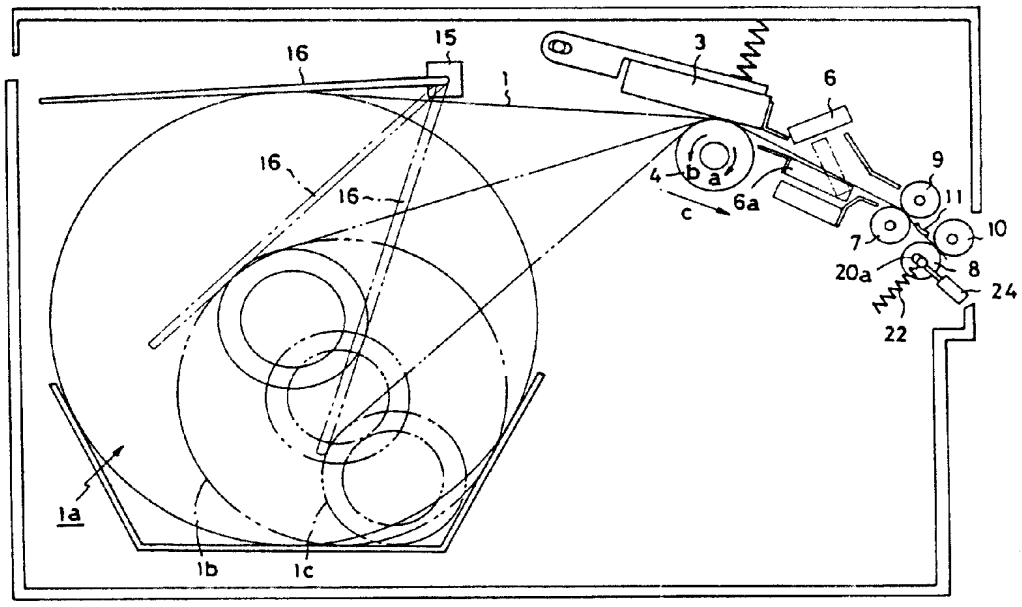
第 3 図



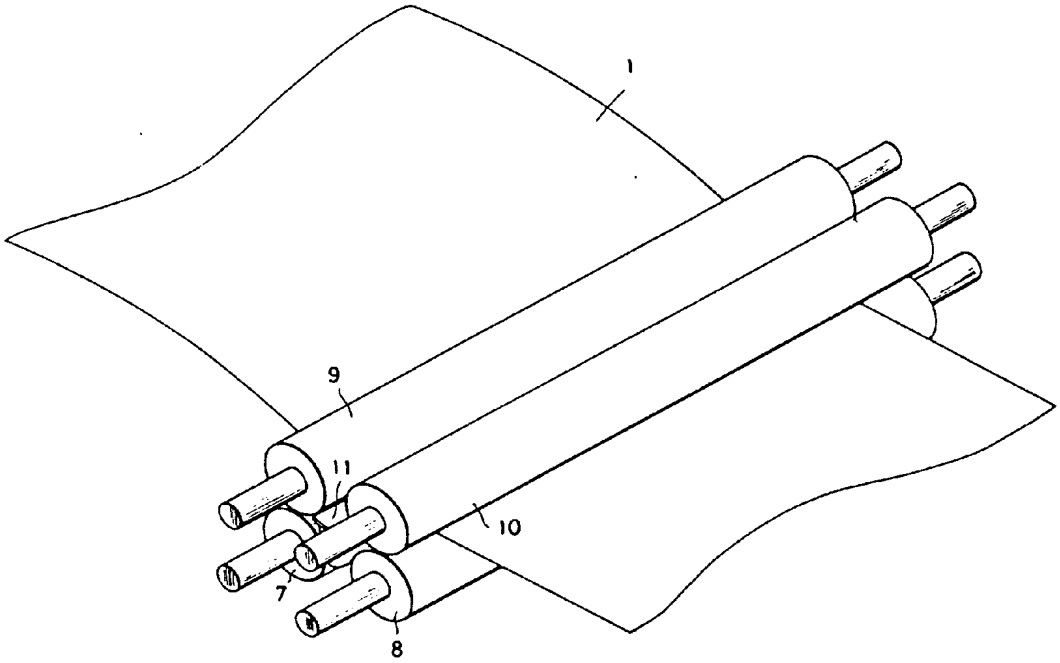
第 4 図



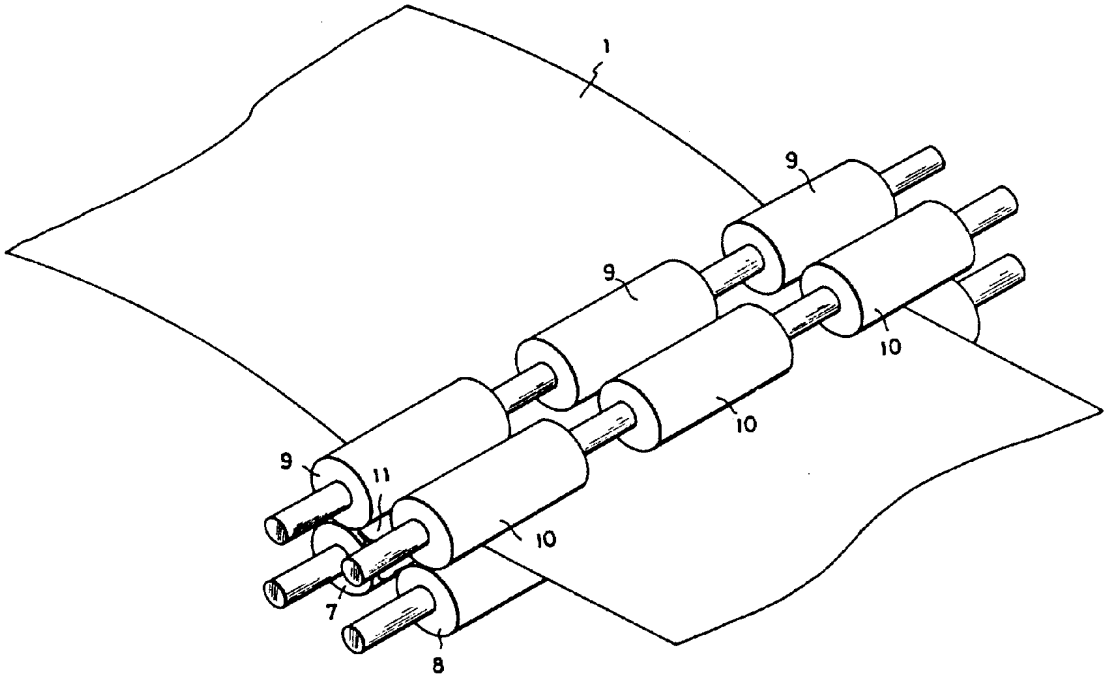
第 1 図



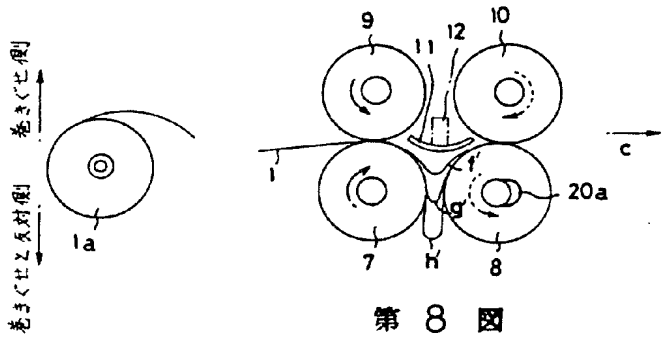
第 5 図



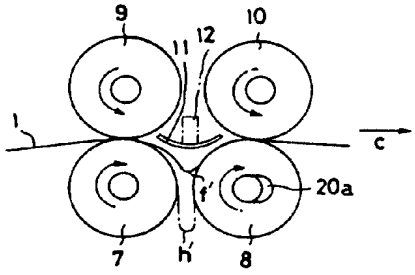
第 6 図



第 7 図


巻きぐせ側
巻きぐせと反対側
1a
9
11
12
10
1
c
f
g
20a
7
h
8

第 8 図


9
11
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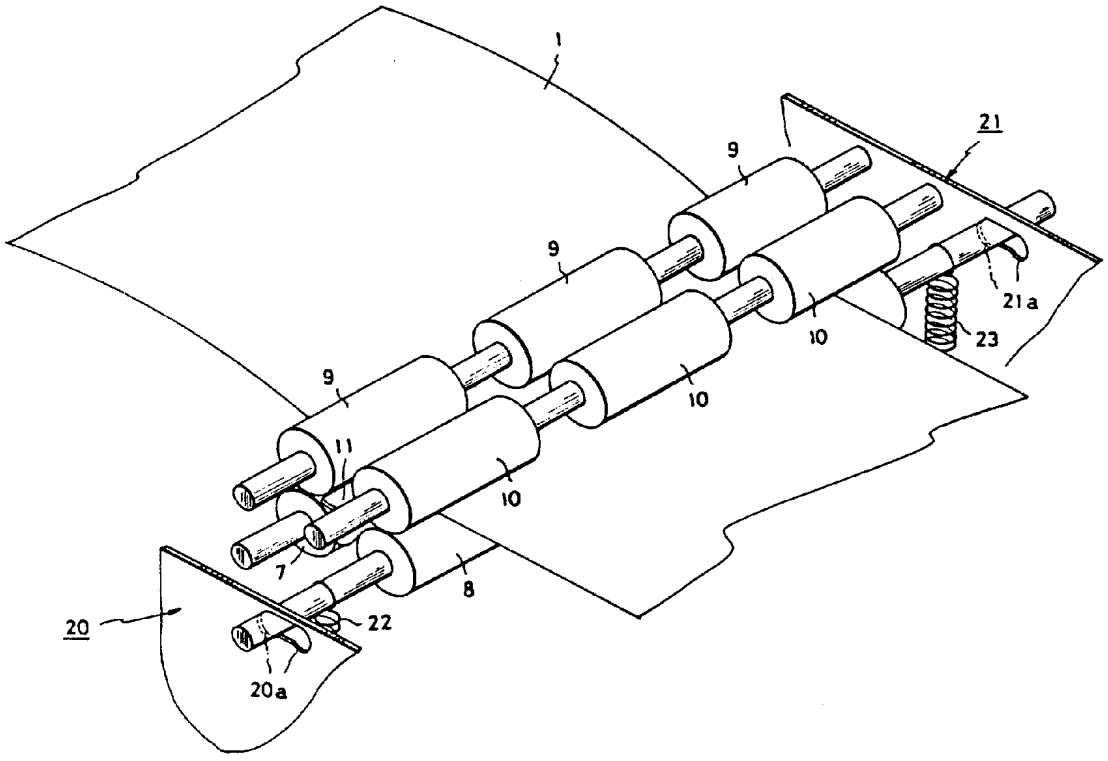
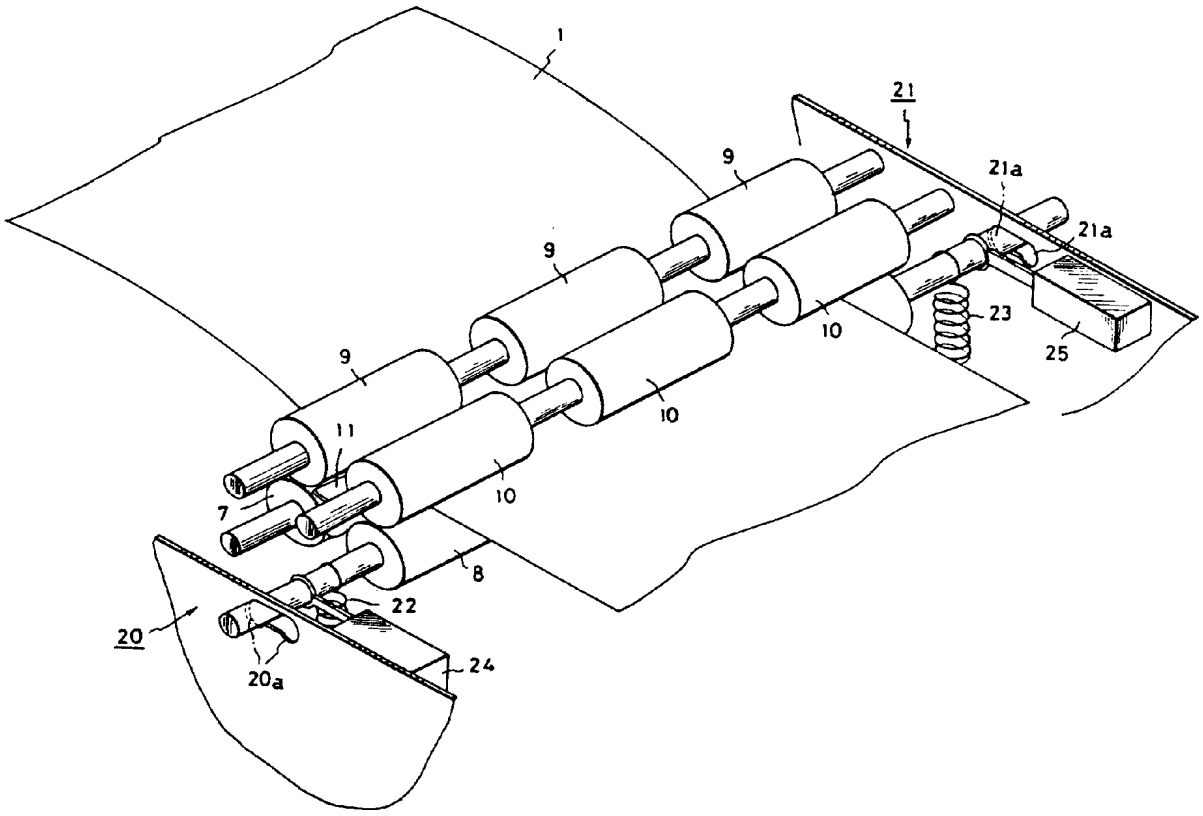
8

第 9 図


1
21
9
9
21a
10
23
9
10
11
10
7
8
20
22
20a

第 10 図



第 11 図